developers

Northwest Indiana Water Planning Initiative

The Water Resource Protection and Conservation Toolkit

This is one of a series of 12 fact sheets developed by the Northwestern Indiana Regional Planning Commission with funding from the Joyce Foundation for the Water Resources Protection and Conservation Toolkit. The toolkit provides background on, and methods to protect and conserve local water resources. These tools are intended to help citizens and local officials to manage and protect water resources for future generations.

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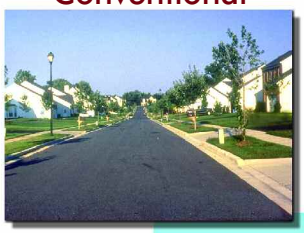
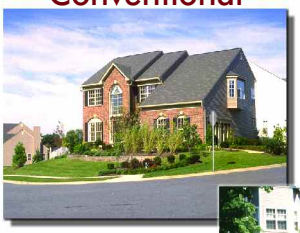
Conventional



Low Impact

Conventional



Functional Landscape Design

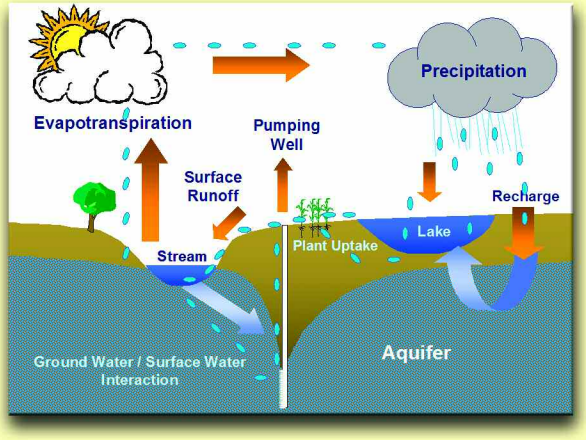
Source: GeoSyntec, Inc.; Low Impact Development Center

How Better Site Planning Can Protect and Conserve Water Resources:

A Guide for Developers

How land is developed and used for housing, commercial and industrial use impacts the quality and quantity of our water. Traditional forms of development interrupt the natural water cycle, often redirecting water to skip important parts of the natural cycle. For example, stormwater conveyed though drains and pipes which carry the water away from the site can keep water from seeping into the local groundwater. This reduces not only the quantity of water available from groundwater but the quality of water (by skipping the natural filtering process) available to support plants, animals, and people living and working in these areas.

Source: USEPA



Water Resources and The Natural Water (or Hydrologic) Cycle

Water resources can be significantly affected by development activities. Water resources move through the water cycle, sometimes called the hydrologic cycle. The water cycle is the continuous movement of water from ocean, lakes, rivers, and other water bodies to air and land then back to these water bodies through rain and snow in a cyclic pattern as water is used and re-used. Some water infiltrates (or seeps into) the ground or evaporates back into the atmosphere.

How are Low Impact Development Practices a Cost-Effective Way to Protect and Conserve Water Resources?

Source: Milwaukee Metropolitan Sewerage District

Low Impact Development (LID) and conservation design are less costly practices that manage environmental challenges by integrating their management into a site's design. Instead of managing runoff through high-cost pipes, drains, and pond systems, LID uses a site's features, such as constructed wetlands and vegetated swales, to clean, recycle, and distribute stormwater over the site. This helps reduce overall and peak flow water volume, improve water quality, and increase the replenishment of groundwater. The basic goals of LID are:

- Conserve and protect natural areas, including wetlands
- Minimize development impacts
- Maintain predevelopment site runoff rate and volume
- Use practices and management plans that address multiple environmental goals
- Implement pollution prevention, proper maintenance, and public education programs

Overview Resources

Conservation Design Resource Manual: Language and Guidelines for Updating Local Ordinances, Northeastern Illinois Planning Commission and Chicago Wilderness, www.nipc.org/environment/sustainable/conservationdesign

Low Impact Development Center: www.lowimpactdevelopment.org

Nonpoint Education for Municipal Organizations Network, www.nemo.uconn.edu/national/index.htm

Planning with Power, www.planningwithpower.org

USEPA Low Impact Development page: www.epa.gov/owow/nps/lid

Source: GeoSyntec, Inc.

Benefits of Low Impact Development

Benefits of LID over conventional developments:

- **Cheaper to construct and maintain.** Developers spend less on pavement, curbs, gutters, piping, and inlet structures as well as costs to grade the land. The Center for Watershed Protection found construction cost savings range between 11% and 66%. On average, the rates are about 25% savings for larger (1 acre) lots and 10% savings for smaller (one-half acre) lots.
- **Longer life cycle cost.** Managing stormwater through natural landscapes decreases costs for constructing ponds and other engineered stormwater management systems and eliminates long-term costly maintenance of these systems.
- **Increases marketability and profitability.** LID creates an aesthetically pleasing and desirable product that often sells faster and at a higher price.
- **Increases number of lots per development site.** LID can increase the number of lots available for sale and development because of the use of flexible lot design and possible incentives.

How Does Better Site Design Work?

Using LID integrates multiple goals and results in better site design, including:

- Reduced impervious coverage that allows water to drain into the soil;
- Increased natural lands set aside for conservation; and
- Increased use of natural drainage resulting in more effective stormwater management.

Mill Creek in Kane County, IL.
Source: Northeastern Illinois Planning Commission

This is done by doing the following:

1. Reducing the amount of impervious surface areas that do not allow water to infiltrate to the ground.

- Work with local government to allow flexibility for road length, width, right-of-way, and design.
- Design parking lots to allow drainage in bioretention areas, filter strips or other practices integrated into landscaping areas, including traffic islands.

Source: GeoSyntec, Inc.

- Use vegetated swales, street storage, curbs, berms and restrictors in drains to temporarily store stormwater on the street itself after heavy rains instead of curbs and gutters to convey and treat stormwater.
- Design driveways that mirror the density of the development, including the use of shared driveways.
- Use permeable surfaces or crown the driveway to allow water to drain into vegetated swales.

2. Protecting and creating natural landscapes and drainage systems

- Identify and design around natural site drainage contours.
- Work with locals to identify site appropriate native plantings.
- Develop natural area management plans and assign responsibility for future management.

3. Working with local government to use flexible lot sizes.

- Work with local government to allow flexibility in lot size, keeping overall site density constant.
- Maintain critical areas for water resource protection and build buffers around critical water resource areas such as sandy soils, streams, and wetlands.

See the Low Impact Development Practices and Benefits Fact Sheet for more details on techniques.

Source: GeoSyntec, Inc.

A February 2005 Chicago Wilderness report analyzed the relative costs of conservation development and traditional development. The report concludes that individual LID practices cost less than traditional development practices and that when multiple practices are combined, together, the cumulative economic effects "can be impressive." Of the ten cases examined, holistic conservation design saved an average of 36% over conventional practices. Some findings include:

- Three subdivision conservation developments in southeastern Wisconsin cost significantly less than conventional developments. Overall site preparation saved between 23 and 32% of conventional development costs. Savings ranged from 47 to 69% where vegetated swales or bioswales were substituted for storm sewers.

- Overall capital cost savings for Moderate Density Residential were 15% of conventional developments. The conventional development form had wide roads, no open space, storm sewers, and turf detention basins. The conservation design had narrow streets, an integrated natural stormwater system, clustering, and open space.

- While some commercial conservation designs have construction costs similar to traditional developments, maintenance of naturalized stormwater management over the long-term decreases life cycle costs.

The full report, Changing Cost Perceptions: An Analysis of Conservation Development is available at:

www.nipc.org/environment/sustainable/conservationdesign/cost%5Fanalysis/

Putting Design Into Practice

Bioretention Applications, Inglewood Demonstration Project, Largo, MD and Florida Aquarium, Tampa, FL,
www.epa.gov/owow/nps/bioretention.pdf,

Conservation Development in Practice, The Nature Conservancy and Chicago Wilderness
www.nipc.org/environment/sustainable/content.htm

Field Evaluation of Permeable Pavements for Stormwater Management
www.epa.gov/owow/nps/pavements.pdf.

The Franklin Best Development Practices Guidebook
www.franklin.ma.us/auto/town/pacdev/currplan/bdpguide/default.htm.

Stormwater Strategies: Community Responses to Runoff Pollution, Chapter 11, Addressing Stormwater in New Development and Redevelopment in the Midwest, National Resources Defense Council,
www.nrdc.org/water/pollution/storm/chap11.asp

Stormwater Strategies: Community Responses to Runoff Pollution, Chapter 12, Low Impact Development, National Resources Defense Council,
www.nrdc.org/water/pollution/storm/chap12.asp

Street Storage for Combined Sewer Surcharge Control, Skokie and Wilmette, IL,
www.epa.gov/owow/nps/streetsurf.pdf

Vegetated Roof Cover, Philadelphia, PA,
www.epa.gov/owow/nps/roofcover.pdf

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